

ACTIVITY 2

Estimations in Computation

Without the use of a calculator, match each computation to the correct estimated answer.

Computation	Estimate
1. 3.92×705	• 3.0
2. $35.89 \div 11.96$	• 54 000
3. $389 \div 9.024$	• 0.25
4. 53.6×1004.2	• 2800
5. 587×0.97	• 0.50
6. 40.1×100.05	• 590
7. $97.9 \div 1.835$	• 61
8. $67 \div 1.071$	• 50
9. $46.9 \div 98$	• 44
10. $0.17 \div 0.78$	• 4000

ACTIVITY 3

Application of Estimations – Cost of Purchase

You are in a shopping centre during the Great Singapore Sale. You see some attractive items at a good bargain. How many items can you buy with the money you have?

There are two ways to estimate the answer.
Suppose you have \$15.60 to spend on comics that cost \$4.90 each.
How many copies can you buy?

Method I

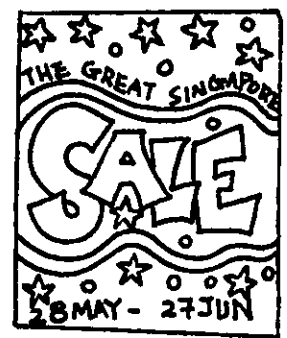
Round up \$4.90 to \$5.00.
3 times \$5.00 gives \$15.00.
 \therefore You can buy not more than 3 copies of the comics.

Method II

Round \$15.60 down to \$15.
Round \$4.90 up to \$5.00.
(15 \div 5) gives 3.
 \therefore You know you can buy at most 3 copies of the magazine.

In the table below, write your estimates for the largest number of each item that you can buy with the given amount of money. Show your working by writing down the approximate numbers you use to arrive at your estimate.

	Item	Price	Amount of money of items	Estimated number of items	Correct number	Check
e.g.	Comics	\$4.90	\$15.60	$15 \div 5 = 3$	3	✓
	Pens	\$1.25	\$5.90			
	3 pairs of socks	\$9.90	\$10.20			
	Pencil case	\$5.70	\$20.00			
	T-shirts	\$7.20	\$18.75			



ACTIVITY 4

Objective

To understand truncation and rounding errors

Procedure

In groups of 4,

- discuss each of the following,
- make predictions of your expected answers,
- summarise your findings and present it to the class.

1. (a) Find $\sqrt{\sqrt{5}}$ using a calculator and write down the answer displayed.

- (b) What would you expect the answer to be if you square the answer in 1(a) twice?

- (c) Square the answer in 1(a) twice and write down the new answer displayed. Is it the same as what you expected?

- (d) Subtract 5 from the answer displayed in 1(c) and state if the calculator displays the expected answer 0.

2. (a) Find $\sqrt{\sqrt{\sqrt{5}}}$ using a calculator and write down the answer displayed.

- (b) What would you expect the answer to be if you square the answer in 2(a) four times?

- (c) Square the answer in 2(a) four times and write down the new answer displayed. Is it the same as what you expected?

- (d) Subtract 5 from the answer displayed in 2(c) and state if the calculator displays the expected answer 0.

3. (a) Find $\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{5}}}}}$ using a calculator and write down the answer displayed.

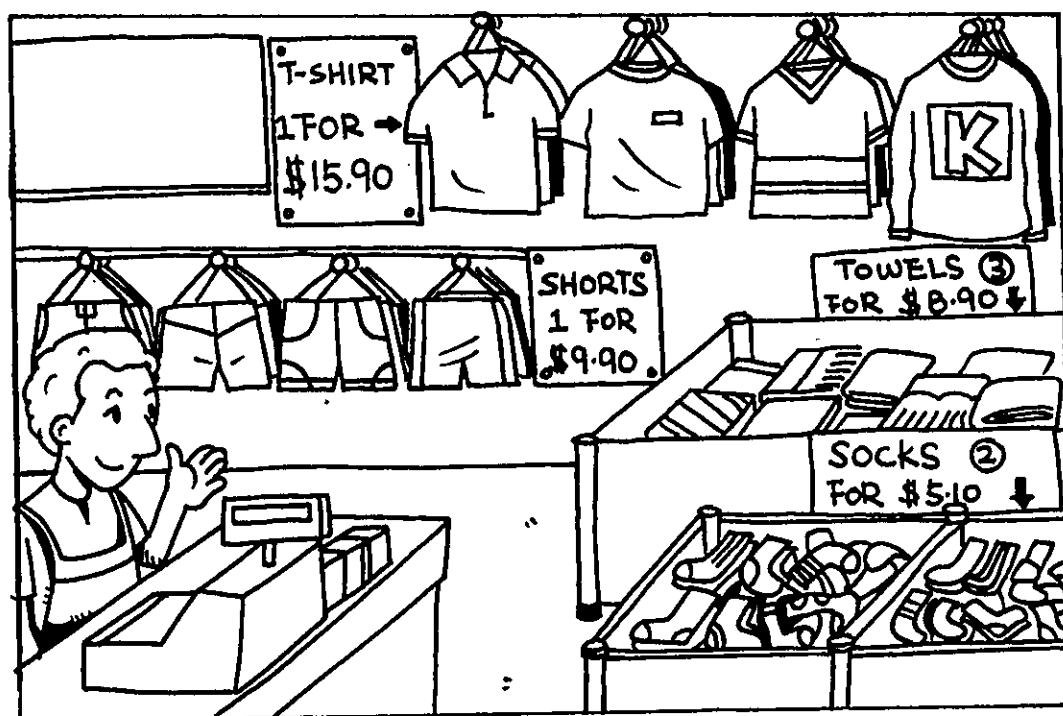
- (b) What would you expect the answer to be if you square the answer in 3(a) six times?

- (c) Square the answer in 3(a) six times and write down the new answer displayed. Is it the same as what you expected?

- (d) Subtract 5 from the answer displayed in 3(c) and state if the calculator displays the expected answer 0.

4. What is the reason why your answers to questions 1, 2 and 3 may differ from your friends?

EXERCISE 1



1. Mrs Chan went to Rahman's Shop and decided to buy 2 pairs of socks, 1 pair of shorts, 1 T-shirt and 3 towels.

(a) Round off the cost of each set of items to the nearest dollar.

Cost of 2 pairs of socks \approx _____

Cost of 1 pair of shorts \approx _____

Cost of 1 T-shirt \approx _____

Cost of 3 towels \approx _____

- (b) Using your answers in (a), find the approximate change Mrs Chan will receive if she gives Rahman a \$50 note.

(c) Find the actual cost of all the items.

(d) Is the approximation higher or lower than the actual cost?

2. With the help of a number line if necessary, round off 7.28
(a) to the nearest tenth,
(b) to the nearest unit.

3. Round off
(a) 253 to the nearest ten,

(b) 468 to the nearest hundred,

(c) 3201 to the nearest thousand.

4. Below are some examples of approximation in daily life.
(a) Ali's height is 1.65 m. Round off his height to 1 decimal place.

Ali's height = _____ (_____)

- (b) Siew Ling's mid-year examination result showed 69.897% in the computer.
Round off her result in percentage to 1 decimal place.

(c) The maximum temperature on Wednesday was 31.4°C. Round off the measurement to the nearest whole number.

(d) The mass of Raju's dog is 5.054 kg. Round off the mass to 2 decimal places.

5. Round off
(a) 6.44 to 1 decimal place,

(b) 3.088 to 2 decimal places,

(c) 0.1005 to 3 decimal places.

EXERCISE 2

1. Read the newspaper clippings below and answer the questions that follow.

**Turkey
earthquake kills
over 147,000.**

**Electricity cost
goes up to
13.66¢ per unit.**

**Charity funfair
at Punggol
raised \$12,780.**

Round off the earthquake death toll to 2 significant figures. Death toll = _____

Round off the electricity cost to 3 significant figures. Electricity cost = _____

Round off the amount raised at the funfair to 2 significant figures. Amount raised = _____



Do you know that figures in newspaper headlines are often approximations? However, sometimes exact figures have to be used. Which, do you think, of the above newspaper clippings used exact figures?

2. Group the given set of numbers in the appropriate column.

407	0.2102	0.001 9	7.2	2.07
18.0	0.000 127 0	1.005	0.003 0	0.070 5

2 significant figures	3 significant figures	4 significant figures

3. Write down the number of significant figures of each number in the blanks provided.

- | | | | |
|-------------|-------|---------------|-------|
| (a) 23.0 | _____ | (b) 75.2 | _____ |
| (c) 90 125 | _____ | (d) 8.07 | _____ |
| (e) 106 | _____ | (f) 6.7 | _____ |
| (g) 40.06 | _____ | (h) 51.30 | _____ |
| (i) 0.0197 | _____ | (j) 0.11 | _____ |
| (k) 0.00078 | _____ | (l) 7 000 000 | _____ |

(*There may be more than one answer for this question)

EXERCISE 3

1. Estimate the result for each of the following.

(a) $58 + 31$

(b) $63 - 17$

(c) 196×52

(d) $790 \div 19$

2. Estimate the results of the following, check if the answers given are reasonable.

(a) $217 + 13 \times 48 = 841$

(b) $(15.2 - 6.9) \div 4.1 = 2.024$

REVISION EXERCISE 2

1. Complete the table by rounding off the numbers.

Number	Nearest 10	Nearest 100	Nearest 1000
3562			
7008			
9805			
15 346			
20 532			

2. Find the approximation for 5.063 05 to the nearest

- (a) tenth,
(b) hundredth,
(c) thousandth.

3. Complete the following table.

Number	Number of significant figures	Number of decimal places
74.31		
0.023		
3.005 7		
0.000 467		
80 631.025		

4. Round off

- (a) 7349 to the nearest hundred,
(b) 16 603 to 2 significant figures,
(c) 183.208 to the nearest hundredth,
(d) 3.7354 to 3 decimal places.

5. Complete the following table (the first row has been done for you).

Number	Correct to			
	2 decimal places	2 significant figures	nearest thousandth	nearest whole number
5.049 3	5.05	5.0	5.049	5
16.290 5				
0.811 9				
10.000 5				
7.123 4				

6. Without using a calculator, estimate the values of the following.

(a) 12.7×5.8 (b) $4.1 \times \sqrt{48.12}$ (c) $\frac{0.68 \times 51}{0.25 \times 78}$

7. In planning for a June holiday camp for 65 students, Mr Daniel Soh determined that \$435 is required for rental of the campsite, \$1025 is required for food supplies, \$1462.50 is required for cost of transportation, and \$350 is required for miscellaneous expenses. Estimate how much (to the nearest dollar) each student should pay to ensure that the camp will not incur a loss.

8. Nora went on a shopping spree and bought the items shown in the table below.

Item	Amount	Price of item
Blouse	18	\$59.90 each
Shoes	7	\$49.00 each
Stockings	18	\$1.95 each

- (a) Calculate, in dollars and cents, the total amount of money she spent.
 (b) A buyer of a department store ordered 580 of the same blouse (at \$59.90 each) and 210 pairs of the same type of shoes (at \$49.00 each). Estimate the total amount that would be spend to the nearest thousand dollars.

9. Arif uses 802.9 units of electricity every month.
 (a) Estimate, to the nearest dollar, the amount on his bill per month. (One unit of electricity costs 8.6 cents and there is a surcharge of \$28.50 per month.)
 (b) In one year, the cost per unit of electricity increased from 8.6 cents to 9.8 cents, while the surcharge remained unchanged. Estimate, to the nearest dollar, the total amount of the electricity bills for that year if Arif continues to use an average of 802.9 units of electricity every month.
10. Leela has \$831.66 in her bank account. She has to write a cheque for \$89.75 and another cheque for \$62.50. Estimate the amount of money left in her account.

- *11. Suzanne wishes to estimate the cost of 4 tapes at \$8.69 each.

- (a) Find the estimate cost of 1 tape, and 4 tapes if she rounds \$8.69 to the nearest ten cents,
 (b) Find the estimate cost of 1 tape, and 4 tapes if she rounds \$8.69 to the nearest dollar.

- *12. Estimate (correct to 1 significant figure) the values of the following.

(a) $48.2 + 1.92 - 15.1$ (b) $27.99 \times 6.8 \div 4.02$

(c) $\frac{\sqrt{15.9} + 56}{9.8}$ (d) $\frac{15.7}{12.4 \times 3.9}$

(e) $\sqrt[3]{126} + \sqrt{101} - \sqrt{24}$ (f) $18.1 - \sqrt[3]{28} - \sqrt{10}$

- *13. A plumber made appointments with three houses on one day to carry out some installation work that required the use of lead. He needed 6 kg of lead for house X, 7.8 kg for house Y and 10.9 kg of lead for house Z. However, he could only buy lead in 1-kg lumps. How many lumps of lead would he need to buy?

- *14. Martha went shopping and bought two comic books at \$1.95 each, a cooking book at \$6.95 and spent \$6.85 for lunch at the food court. At the end of the day, she had \$24.45 left. Estimate the amount of money (to the nearest dollar) that she had at first.

PROJECT

Budgeting for Community Service Projects

During one of your school's community service projects, your group was asked to help to shop for some groceries to be brought to the old folks' home. You are required to work out an estimated budget for the purchase of the items.

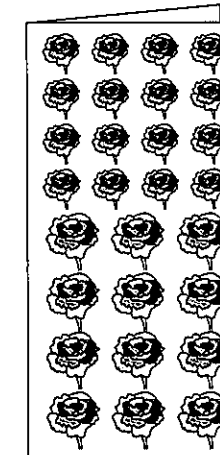
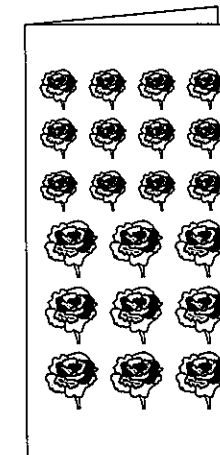
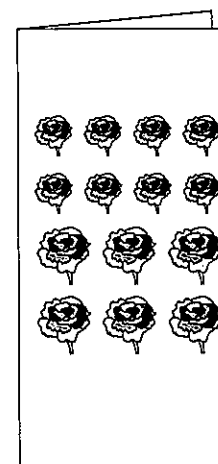
You are required to

- make a shopping list of 20 items you use regularly which can be bought at the supermarket,
 - write down the estimated cost of each item,
 - sum up the estimated prices to estimate the total cost of the items,
 - make a trip to the supermarket and record the actual prices of each item,
 - add up these prices to find the actual total cost,
 - comment on how close your estimate was compared to the actual cost.
- (Do not forget to add the GST charges.)

Ratio

ACTIVITY 1

1. Kim has a set of three flower cards, each printed with large and small flowers, as shown below. Write down the ratios of the small flowers to large flowers for each set.



2. A flower card named 'Sweety' has 20 small flowers. Based on the design shown above, how many large flowers does the card have?
3. Another flower card called 'Colourful' has 70 flowers altogether. Based on the design shown above, how many small and large flowers does the card have?
4. May has another set of 'Hearty' cards. Each card has 5 small hearts for every 4 large hearts. Make a sketch of a 'Hearty' card that has 15 small hearts.